

Claims:

1. A display element comprising at least two porous layers, a conductive liquid residing in the upper layer, the liquid having a contact angle with the material of the upper layer of less than about 60°, the material of the lower layer being conductive and insulated from the liquid with a dielectric covering, the liquid having a contact angle with the material of the lower layer of greater than about 90°, whereby on application of a voltage between the lower layer and the liquid the liquid moves out of the upper layer into the lower layer thereby effecting an optical change in the upper layer.

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2. An element as claimed in claim 1 wherein the upper layer comprises a plurality of particles.

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3. An element as claimed in claim 1 or 2 wherein the lower layer comprises a plurality of conductive particles covered with a dielectric layer.

4. An element as claimed in claim 3 wherein the conductive particles are metallic.

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5. An element as claimed in claim 3 wherein the conductive particles are organic or inorganic particles covered with a conductive shell.

6. An element as claimed in claim 5 wherein the thickness of the conductive shell is chosen to create a coloured particle.

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7. An element as claimed in any preceding claim wherein the dielectric covering is a polymer, a polyelectrolyte, a fluoropolymer, a self assembled monolayer (SAM) or an inorganic shell.

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8. An element as claimed in claim 7 wherein the SAM comprises a molecule with a group that bonds to the conductive particles and a group that provides a high contact angle with the liquid.

9. An element as claimed in any preceding claim wherein an intermediate layer of coloured material is provided between the upper layer and the lower layer.

5 10. An element as claimed in claim 9 wherein the material of the intermediate layer comprises a plurality of particles providing an average pore size substantially the same as that of the upper layer, the liquid having a contact angle with the plurality of particles of less than about 60°.

10 11. An element as claimed in any preceding claim wherein each layer has a pore size greater than about 30 nm and less than about 2 μ m.

15 12. An element as claimed in any preceding claim wherein the conductive liquid and the material of the upper layer have substantially the same refractive index.

13. An element as claimed in any preceding claim wherein the conductive liquid is created by adding ions to a solvent.

20 14. An element as claimed in any of claims 1 to 12 wherein the conductive liquid is an ionic liquid.

15. An element as claimed in any preceding claim wherein the conductive liquid contains a dye or pigment to provide a coloured liquid.

25 16. An element as claimed in any preceding claim wherein the upper layer comprises a photonic crystal structure.

17. A device comprising at least one element as claimed in any preceding claim including means for connection of each element to a circuit to create a matrix display.

18. A device comprising at least one element as claimed in any preceding claim, the materials of each layer being coated onto a support material.

19. A device as claimed in claim 18 wherein each element is
5 environmentally sealed.